THE ZOOLOGIST

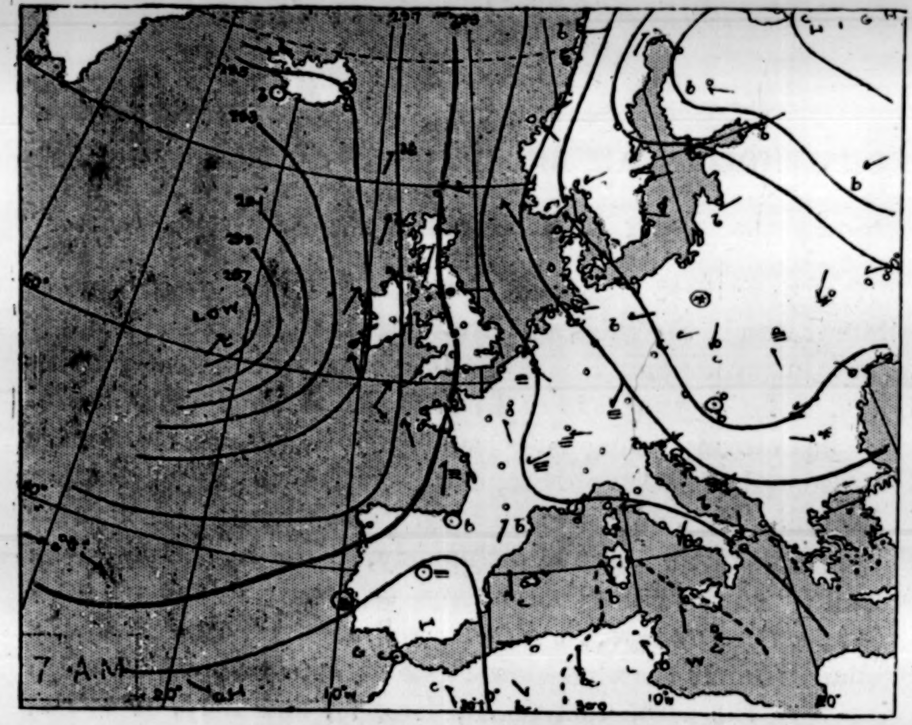
No. 863.—May 15th, 1913.

ORNITHOLOGICAL REPORT FOR NORFOLK (1912).

By J. H. Gurney, F.Z.S.

The year 1912 has been noticeable for the great rush of wildfowl which, the gales and Arctic weather combined, brought us in January not only Ducks of all the familiar species and Brent Geese, but also hundreds of Little Auks, of which 'The Zoologist' has already had some account from the pen of Mr. Arthur Patterson (Zool. 1912, pp. 115, 418). Sharp as was the weather in Norfolk and Suffolk, we must turn elsewhere to account for the presence of all these birds, namely, to the conditions which prevailed much further north, and especially in the north of Scotland, the Orkneys, Shetlands, and in the Faroes. In the Shetland Islands the wind blew a gale on Jan. 15th, its direction being from the south-east (S.E., force 7), and here, it seems, we have the key to this southward rush of wildfowl into England. On the 16th the wind was still higher, being S.E., force 8, at the Shetlands, and on the 17th and 18th it had reached to force 9, which is almost a hurricane, after which it dropped. On none of these days was there much frost in Scotland or the Shetland Isles, the thermometer, according to the returns, not falling lower than 38° at any station, but in Norway the readings were lower. If, therefore, the wildfowl came from Scotland and the isles beyond, as I suppose, it is evident that they were not expelled by frost, but that the rush was due to wind and wild weather.

The Breeding Season.—As far as common birds are concerned, the nesting season was fairly prolific. The breeding of the Common Sandpiper for the second time in Norfolk is an event of importance, while the nidification of the Curlew near Lynn, of the Bittern on the Broads, and of the Little Owl (on Mr. Tracey's authority) is certainly not less so; moreover, except in the case of the Owl, they are proofs of the value of protection. The spread of the Little Owl, which is general in other parts of England, seems to be making itself felt in Norfolk. My correspondent, Mr. Tracey, had it on good authority that some bred not very far from Lynn, and he was actually shown four eggs, besides a photograph which had been taken of some young ones.



January 15th, 1912 (see preceding page).

On June 1st a flock of about twenty Crossbills was seen by the Rev. M. H. Bird, busy on a clump of fir-trees at Wroxham, and this is the only wandering band that either he or I have heard of. My gardener, who knows them well, identified a single Crossbill on the wing at Northrepps in September, and again he saw a single bird towards the end of October. This does not

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look like breeding; and, as regards nests, there is not much to announce this year, save that a few may have bred on the western side of the county, and that a supposed nest was built in a fir-tree at Caister, near Yarmouth (T. W. Hogarth). Another nest was recorded in the north of Suffolk, which has been more favoured than Norfolk by Crossbills.*

The Autumnal Migration.—The movement which Mr. B. B. Riviere and Mr. S. Long witnessed in November was, as all our great autumnal rushes of birds have been before, a movement from the east. This time the advancing army must have come to England in great strength, and, as has happened before, the species were many, and their arrival more or less continuous throughout the day. When autumn migrants, and especially when migrants of many diverse species, are seen coming into Norfolk by day, as in this instance, it has generally been assumed, and with reason, that their passage has been retarded by contrary winds. It is always dangerous to theorise, but so far as local observations go, it would seem that very few, if any, migrants arrive by their own choice on the coast of Norfolk in the daytime, except Rooks and Crows, and perhaps Sky-Larks. Yet probably the Larks which we see are few indeed to what pass over in the night, for Mr. Eagle Clarke says that no other species perishes in such numbers at the light-stations as Larks do ('Studies in Bird Migration,' i. p. 230). On referring to the Daily Reports issued by the Meteorological Society, it is clear that the theory of a retarded migration is borne out by what happened on Nov. 6th and 7th. At 7 a.m. on the morning of the 6th the wind was south-west in Norway, being registered S.W., force 8, at Skudesnæs, and S.W., 6, at Karlstad, Christiania and Bodo. It was south-west also at three stations in Sweden, and at two in Denmark. This south-west wind, then, may be fairly considered to have been the factor which checked the migrants bent on coming to England; they did actually arrive in Norfolk and Lincolnshire on Nov. 6th, but if it had not been for the wind they would have arrived sooner. Those, again, of which Mr. Riviere witnessed the arrival on the second day, namely, on Nov. 7th, were in all probability held back or checked by the same cause, for the wind on the evening of the 6th was again south-west in Denmark and throughout the south of Norway, reaching its maximum (S.W., force 6), according to published returns, at Christiania.

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* The earliest notice of the Crossbill in this country, if not in any country, is contained in Paris 'Chronicle,' under date of 1251:—"In the course of this year [1251]," writes the Monk of St. Albans, "about the fruit-season [*i. e.* September], there appeared, in the orchards chiefly, some remarkable birds, which had never been before seen in England, somewhat larger than larks, which ate the kernel of the fruit and nothing else, whereby the trees were fruitless, to the loss of many. The beaks of these birds were crossed, so that by these means they opened the fruit as if with pincers or a knife; and that part of the fruit which they left was, as it were, infected with poison" (Bohn's translation). I believe my late father's notice was drawn to this passage about 1862, and in 1880 Professor Newton, who very likely received a reference to it from him, ascertained, through the medium of "Notes and Queries," that the original account in manuscript still existed at Corpus College (*cf.* 'British Birds,' iv. p. 190).

Thanks to Professor J. Thienemann, this great movement of migratory birds can be traced as far as the Baltic, but it probably had its origin still further east; in fact, there may have been, and probably was, a wave of birds moving westward at one time over the greater part of Central Europe, having its origin in Russia. It may be asked: Why do migratory birds leave Europe for the shores of England when the wind is against them? The answer probably is: (1) that the time for departure has come, or is already past, and their numbers are in danger of becoming congested; and (2) that most birds are indifferent to a moderate head-wind so long as the land is beneath them, and when they come to the sea they go flying on, impelled by that "sixth sense" which human beings do not possess.

As regards the speed of migratory birds, about which so much has been written, here again the wind comes into play, for their speed, I believe, depends largely, if not principally, on its force and direction. It is difficult to credit a hundred miles an hour as possible for any bird, except it be carried over the North Sea in one of our great easterly gales like a scrap of paper. It then ceases to be a free agent, and is very fortunate if it reaches *terra firma* alive. Under ordinary circumstances the rate of a migrant's speed probably does not exceed thirty miles an hour, and it would be much less with a strong head-wind, I am persuaded. It is true that this does not coincide with the opinions expressed by H. Gätke, but it agrees with the later and more matured conclusions of Mr. Eagle Clarke ('Studies in Bird Migration,' i. p. 25; ii. p. 29). There is a well-authenticated story, vouched for by the late Mr. W. B. Tegetmeier (*cf.* 'The Field,' July 9th, 1898), of a Homer Pigeon, released in the Shetland Isles, which, with a good wind at its back the whole way to England, did five hundred and ninety-one miles in sixteen hours, and this, though considered to be one of the fastest flights on record, only works out at thirty-seven miles an hour. It is, therefore, evident that a hundred miles an hour must be a very unusual speed for a bird of whatever species. The fastest flight on record of a monoplane up to the present has been only ninety-seven miles, and of an express train much less. Supposing that the birds seen by Mr. Riviere kept up a speed of twenty-five miles an hour, they would have taken five and a half hours to travel from Holland, or thirteen hours to travel from Denmark, or thirty-four hours from Rossitten, in the Baltic, where, as will be mentioned presently, Professor Thienemann reports "a great migration" on Nov. 5th.

Principal Rarities.—The principal Norfolk rarities for 1912 were: A Little Bustard and a Great Skua in January; a White Stork in April; a Scops Owl in June; a Squacco Heron and a Great Reed-Warbler in July; a small flock of Barred Warblers in September; an Aquatic Warbler, a Nutcracker, two Ruddy Sheld-Ducks, and a Porphyrio (but these latter had probably escaped) in October; a Glossy Ibis in November, and another in December.

I have copied all the notes in Mr. Jary's "Diary" about the Spoonbill, as that is a bird of special local interest, but have not thought it necessary to do the same with observations about Terns and other water-birds seen on Breydon Broad, as they can be obtained *in extenso* from Mr. H. P. Frederick, the Honorary Secretary of the Breydon Wild Birds Protection Society, whose balance-sheet, I am sorry to see, again shows a deficit. This useful Society, started by the late Sir Edward and Professor Newton, would collapse but for outside aid, in which case the Spoonbills would soon disappear.

The Weather.—The year's rainfall was unprecedented, owing to the great cloud-burst on Aug. 26th, which brought down from seven to eight inches of rain, and did enormous damage. For the twelve months, two rain-gauges kept in the parish of Keswick made the rainfall respectively 34·08 and 34·73 in., and on the other side of Norwich it was more. In other respects the weather was not abnormal.

JANUARY.

4th.—W., 3. A very mild day. Thrushes singing, and Wood-Pigeons cooing. A Little Bustard† shot near Norwich by Mr. A. Mason, by whom it was exhibited before the Norwich Naturalists' Society. Another was shot in Kincardineshire on the 1st, and another in Devonshire on the 11th ('British Birds,' vi. p. 225); probably they all started from the same area, wherever it was. Although a species of southern distribution, the visits of the Little Bustard to England are generally in the winter.

6th.—An immature Black Guillemot at Blakeney (Sir T. Digby Pigott).

10th.—A Stone Curlew seen at East Ruston, and a Bearded Tit on Brunstead Common (M. C. Bird), and the day following Mr. F. H. Barclay flushed a Bittern at Hoveton, from a reed-bed, and saw a fine male Goosander.

12th.—Twenty-five Woodcocks obtained by H.R.H. the Prince of Wales at Castle Rising.

15th.—S.E., 3, at Yarmouth. On this day thousands of Lapwings were noted by General Upcher to be congregating on the extensive marshes of St. Olive's. These feathered barometers were perhaps from Scotland—at any rate, they knew what sort of weather was coming, and their foresight had made them the first to seek safety by going south in search of soft pastures, where worms were still to be found.

16th.—S.E., 5. All sorts of Ducks rushing through Yarmouth roadstead (Mr. Arthur Patterson). Mr. Ben Dye writes: "Strong south-easterly gale; numerous flocks of Wild Ducks, Brent Geese, Scoters, Knots, and Dunlins" passing.

17th.—E.S.E., 6. This was a very sharp day—what one knows only too well as a keen, biting, wind-frost—and was followed within twelve hours by snow. The wind at Yarmouth got up to force 6, which is equal to thirty-five miles an hour, while further north it rose still higher, amounting at Spurn Point to force 10, which is almost a hurricane. Wildfowl were everywhere on the move, particularly on or near the coast, and an army of shore-gunners turned out to salute them. Mr. Dye, writing again from Yarmouth, says: "Gale continuing; Scaup, Sheld-Ducks, and Mallard going south"—there were wildfowl everywhere. Going out with some friends, we got three Teal and fifteen Mallard, and saw a great many more, as well as four Tufted Ducks,† which were too wild to be secured. On some of the Broads there were so many fowl that the water was literally black with them, I was told.

18th.—Mr. Patterson saw a flock of nearly seventy Brent Geese, and a few days afterwards Mr. Dye heard of eight of these birds being killed at one discharge. Examples sent to Mr. E. C. Saunders included what is most probably the Pale-breasted Brent (*Branta b. glaucogastra* (Brehm)). They must have been abundant at many other places, as later on Leadenhall Market was full of them, some with pale under parts, and others very dark.†

19th.—Goosanders reported at several places on the coast-line, as well as on some of our inland Broads; one which Mr. Roberts received from Bacton, had in it a small Pike.† Some fine old Golden-eyes have been shot, and at least ten adult Smews passed through the hands of Mr. E. C. Saunders and others.

20th.—*Little Auks.*—Following on this rush of wildfowl came an invasion of Little Auks, and at the same time some Slavonian and Great Crested Grebes; these latter were, I conclude, driven from inland waters to the sea. Perhaps the reason for the Little Auks being later comers than the Wild Ducks and Geese was that their progress would be more by swimming than by flying, also that they came from further north. The first intimation of their presence was at Cley, where several were to be seen from the beach on Jan. 20th (H. N. Pashley), the same day on which they were seen off Yorkshire. Examples, living and dead, were speedily picked up, not only there but at many other places near the sea. Others were found stranded on the shore, either dead or incapable, especially at Wells, Blakeney (Pashley), Cley, Salthouse, Cromer (H. Cole), Mundesley, Eccles (M. C. Bird), and Yarmouth (E. C. Saunders). No attempt was made to count them, but, including what were seen at sea, they must have exceeded two hundred and fifty; still, I hardly think they were as numerous as in 1895, when three Norwich birdstuffers set up eighty-four. Mr. J. W. Smalls, of Wells, considers that sixty occurred at that place alone this year. One† dropped in my stable-yard at Northrepps, and, having found its way in by an open door, was discovered there next morning, but, though seeming to be uninjured, it did not live long. Mr. Patterson was told that some of the Little Auks actually dropped on fishing-boats, which is very unusual, I should say. A Little Auk,† which Mr. T. E. Gunn had alive, showed the white spot over the eye particularly well, and we noticed how prominently it stood out when the Auk was excited, but when quiescent it was almost lost. The somewhat inflated cheeks were also noted, and it appears that they can be used as a receptacle for food. The tongue is large and white, and the palate serrated, or, as Macgillivray better describes it, "covered with horny reversed papillæ." The glossy blackness of the back is a striking feature, but this quickly fades. No observations were made as to separation of the sexes this time (*cf.* Zool. 1896, p. 171, and 1900, p. 125).

21st.—According to 'The Angler's News,' the Pink-footed Geese feeding in the Holkam Marshes on Sunday (21st) were so numerous that one could not count them. "They resembled a flock of sheep, and it is no exaggeration to say that as many as six hundred were to be seen at one time. Amongst these was one bird of a creamy white." . . . (J. W. Smalls). This may have been a Snow Goose from Woburn, where they are bred by the Duchess of Bedford.

25th.—A Little Gull found dead in a reed-bed at Hoveton by Mr. Barclay.

28th.—A Great Skua found dead on the beach by Mr. H. Cole; also a Woodcock, a Curlew, a Velvet Scoter, a Mallard, a Herring-Gull, two Common Gulls, several Black-headed Gulls, two Razorbills, nine Guillemots, five Little Auks, three Oystercatchers, and a Pheasant. All this miscellaneous collection was lying on the shore in the short distance (five miles) between Cromer and Mundesley. The Great Skua, which is a rare Norfolk bird at any time, was in good condition, but several of the other birds were partially eaten, probably by starving Gulls. On this day there were 15° of frost.

29th.—A Bernicle Goose shot at Runton (H. Cole). Two Dabchicks beneath the Bishop's Bridge in Norwich (E. Gunn).

FEBRUARY.

2nd.—This was the coldest day of all, the thermometer being nearly down to zero, with very little wind. Eighteen Wild Geese flew over Northrepps Hill House (Burdett), and there were nearly a hundred frozen-out Waterhens on the Keswick River, besides two Water-Rails. Redwings had a hard time of it, and a Bittern was picked up dead. Other species which suffered were the Wren, Chaffinch, Bearded Tit, Kingfisher, and Coot (E. C. Saunders).

4th. — Mr. Cole, again continuing his researches among the *débris* at high-water mark, but in an opposite direction to his last walk, found twelve Little Auks on the beach between Cromer and Beeston, as well as three Razorbills, seven Guillemots, two young Puffins, one Great Black-backed Gull, and six Black-headed Gulls.

8th.—After this the weather improved, though still very cold. On the 15th a pair of Whooper Swans paid Keswick a visit, and seemed content with our small river (the Yare), until one† of them allowed my nephew to get within range, and it now adorns the National Collection. I am not sure that I have heard of any Whooper Swans on our river since February, 1838, when my father nearly approached four at Earlham (1838 was a great Swan year; *cf.* 'Guns and Shooting,' by P. Hawker, 1844, p. 274).

22nd.—The Rev. M. C. Bird observed two pairs of Mistle-Thrushes already nest-building, and on the 29th a Bittern was booming.

MARCH.

2nd.—With these signs of spring it was not suprising to hear of the Ringed Plovers having returned on the 2nd to Santon (W. G. Clarke), which is near Thetford.

29th.—Mr. W. G. Clarke flushed a Stone Curlew at Honingham, where he says a pair remained until the beginning of August, and, he thinks, bred; the next day one was seen at Icklingham by Mr. C. A. Hamond. Two or three pairs, I am informed by Mr. N. Tracey, breed at Roydon; I learn also from Mr. Tracey that a pair of Curlews (*N. arquata*) bred again near Lynn, and hatched off.

APRIL.

19th.—Sky-Lark's nest with three young.†

22nd.—The Tawny Owls again had young in the same pigeonlocker as last year (Zool. 1912, p. 129), which is fixed on a pole about twenty feet high, but to-day one of the nestlings† was lying dead on the grass; a large pellet of rat's fur, which it had tried in vain to eject, had stuck in its mouth and apparently suffocated it. Tawny Owls do not leave pellets in the holes in which they nest, in this respect their habits being much more cleanly than the Barn-Owl's. Mr. Steele Elliott, in his excellent account of this species (Zool. 1912, p. 293), does not at all overrate the boldness of the Tawny Owl in defence of its young, of which I have had evidence more than once; in fact, to approach a nest at such a time is distinctly dangerous, and in France once cost a too venturesome boy an eye. This happened near Avranches, in Manche. I have found the Eagle-Owl to be very savage also in confinement when it has young.

24th.—Lesser Redpoll's nest with five eggs at Croxton (B. B. Riviere).

26th.—A White Stork seen at Hickling. I hope it escaped and passed on.

29th.—This afternoon I accompanied Mr. Robert Gurney to a place where a Bittern was believed to be. It was not audible until 5.45 p.m., and then only faintly, but during the next two hours it went on booming pretty loudly at intervals. Altogether we counted about ten booms, none of them lasting more than forty-five seconds. It is a sound which cannot be expressed in words, and a well-known writer is not far wrong in applying to it the epithet "awful." First there comes a long-drawn gasp, then another and another, each louder than the one before it, until the weird sound is like a regimental drum, and then in a moment it abruptly ceases. There are three consecutive booms, or five; I did not hear more. It is only the male which booms, and if the weather is windy and unsettled, he remains silent; the Broad-man says sunny weather is what the Bittern likes best, and then he will serenade his mate. I understand the female has also a cry, but it is not like the male's.

May.

2nd.—*Norfolk Spoonbills.*—Every year we have the presence of Spoonbills on Breydon Broad, which I imagine is the only place in England annually visited by them. Here, instead of being shot as formerly, they are now protected by a paid watcher. Two appeared on May 2nd (the wind in the night being S., 3), one of them, according to our watcher Jary, a fine bird, the other smaller. Soon after this a pair, possibly the same, were seen by Mr. C. Borrer in the north of the county, and on the 6th Jary reported three at Breydon. On May 20th he saw another, which had found a mate on the 22nd, but they only stayed until the 27th. On June 5th three more came to Breydon, these being probably from Southwold, in Suffolk, where Mr. J. G. Tuck had seen them the day before, but they did not stay longer than the 8th. After an interval of five weeks there was another on the muds on July 13th, apparently a young bird of the year, and this had a companion on the 19th. Breydon Broad, however, was not sufficiently quiet for their taste, and both of them had gone on July 21st, but they thought better of it, and came back on the 23rd, only to depart once more on the 26th, after which Mr. Borrer heard that they were seen at Cley, but no more came to Breydon. Although the Spoonbill has been occasionally recorded in winter, it is essentially a summer migrant to the eastern counties. On looking back to previous "Reports" (Zool. 1904, pp. 206 *et seq.*), it will be seen that the earliest arrival of the Spoonbill on Breydon Broad has generally been in April. Since 1897 it has been noted eleven times in that month, as against three in May and one in March. Sir Thomas Browne, who wrote about 1663, regarded them as summer migrants coming to Norfolk in March, but no doubt they were commoner then; yet he only knew of them as breeding at the mouth of the Orwell, in Suffolk.

3rd.—Three Teals' nests, containing clutches of ten, four, and eight eggs (the last unfortunately trodden on by cattle), were found by Mr. B. B. Riviere on one of the Broads adjacent to the River Bure.

12th.—Two nests of the Gadwall, containing respectively nine and seven eggs, found by Mr. Riviere on the western side of the county. Two Reeves were also seen by Mr. Riviere and Mr. Meiklejohn at Fowlmere Lake, near Thetford, possibly revisiting a site where their predecessors had once bred.

21st.—An Orange-legged Hobby (?) seen on one of the Broads by Mr. E. Meade-Waldo. This species and the Common Hobby, one of which was identified at Wootton on the 15th (N. Tracey), are now about equally rare in Norfolk, thanks to gamekeepers, who have entirely destroyed the small breeding stock of the latter bird.

28th.—An Osprey seen by Mr. F. H. Barclay at Morston, where it had been some time fishing the channel up to Cley, and often resting on the river-posts.

31st.—One day this month Mr. Pashley observed a fine Bluethroat perched on his garden-wall, which is nearly in the middle of the village, and he could hear another calling in the next garden. Their presence with us is not often detected in the close-time; unfortunately he omitted to note the exact date.

June.

5th.—*Norfolk Terneries.*—Walked to Blakeney Point with three good naturalists who had not seen our largest settlement of Terns this year, on our way counting nineteen Sheld-Ducks, and finding the wings of a dead one. Since the publication of an account of this fine settlement (Zool. 1904, p. 216)—for it is not correct to speak of any permanent breeding-place as a colony—it has increased apace, and at the present time the watcher put on by Mr. Quintin Gurney estimates the nests at: Common Tern, 350; Lesser Tern, 100; Ringed Plover, 40; Sheld-Duck, 3 or 4; Oystercatcher, 1. We quickly noticed many Common Terns' nests, some containing three eggs, others only two, but not a single egg was hatched. There was frequently so much disparity amongst the eggs both in size and colour as to lead to the conclusion that different individuals make use of the same nest. Most of these so-called "nests" had a fabric of bents of sea-marram, but in some there was none at all. All of them were located in the open, none having sought the shade of the *Suæda fructuosa*, which grows abundantly at Blakeney. From time immemorial one pair of Oystercatchers has bred, or tried to breed, here, but it is curious that not more do so, considering the extent of suitable ground. We had expected to find the eggs hatched, but they must have been a late clutch, for they were not, and my nephew found them still intact on June 15th. With regard to the smaller settlement of Terns at Wolterton, Mr. G. Cresswell, who has done his best for many years in protecting them, informs the subscribers, in an interesting Report, of the arrival of both the Common and Lesser species on April 20th, and the finding of the first Lesser Tern's egg on May 12th. The number of nests of each species was in excess of 1911, namely, 73 Lesser Terns' nests as against 59 in 1911, 100 Common Terns' as against 73, and 66 Ringed Plovers' as against 49. There is another Ternery at Wells, which, thanks to Mr. Hamond, has been well guarded.

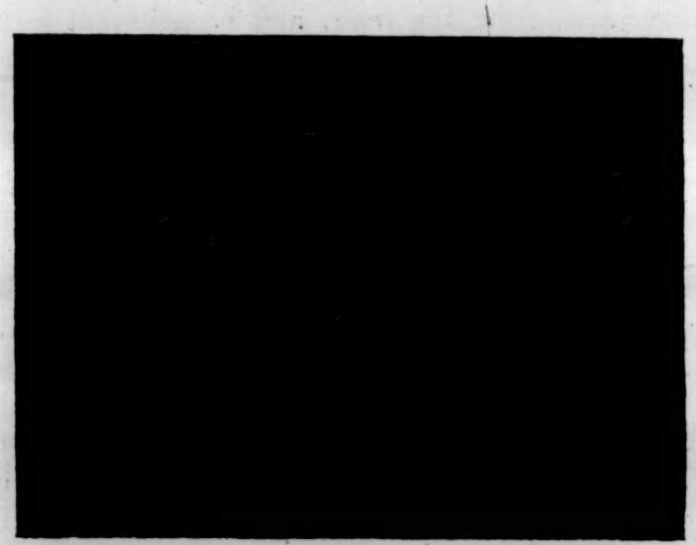
15th.—A Scops Owl, shot at Heacham. I learn from Mr. B. Lowerison, by whom its specific identity was established, that for a month previous its monotonous "kiu, kiu"—a sound to be often heard in the South of France—had been heard almost nightly in a grove near the river, an interval of about five seconds regularly intervening between each note. I am afraid this interesting visitor fell a victim to the irrepressible gamekeeper at last, unlike one which appeared at Sidestrand in April, 1892, which was fortunately protected. This makes six reliable occurrences for the county.

27th.—This morning Mr. Falcon was walking with his spaniel by the Bure, at Coltishall, when the dog ran into some herbage about fifty yards from the river, and brought out a nestling Common Sandpiper, still in the down, but large enough to run well when released. Going to the same spot in the afternoon with Mr. Falcon and another friend, we failed to find the young one again or its nest, but both the parents were there, and the female, evidently greatly agitated by our presence, perched repeatedly on trees near by, even on branches as high as twenty-five feet from the ground, uttering all the while a piping cry, which we took to be a note of warning to the young to keep where they were hidden. Although a few Common Sandpipers generally stay in Norfolk and Suffolk until June, and although they have been often suspected of breeding, this is only the second case in which we have obtained actual proof of their having done so, the first one having been in 1897 at Hickling (*cf.* Zool. 1898, p. 110).

JULY.

5th.—According to an announcement in 'The Zoologist' (1912, p. 420), and 'British Birds' (p. 122), a Squacco Heron was shot at Horning, but I have not seen it; it is fifty years since this species has been observed in Norfolk. The shooter, whoever he was, laid himself open to a fine, of which he was possibly not aware. The body was submitted to a well-known naturalist, who states that the genital organs were not very large, from which he concluded that it was a non-breeding bird; but, in any case, it was not allowed the chance of finding a mate.

Contents of a Barn-Owl's Stomach.



Fur of Voles and Shrews from Barn-Owl's Stomach.

10th.—Invited to inspect four young Barn-Owls in a pigeon-loft no longer used by Pigeons. A few days afterwards (18th) Miss Buxton found lying on the ground under the entrance to the loft a young rat and a nearly full-grown Snipe†, minus its head. This must surely be very unusual—at least, such an incident as a Barn-Owl killing a Snipe has never come under my notice before. May I here introduce two suggestive photographs, taken in Yorkshire by another friend of the Barn-Owl, Mr. G. Parkin; one gives the contents of a Barn-Owl's stomach, *viz.* bones of mice and young rats, the other the conglomerate of fur from which they were extracted (p. 174). On May 21st, Mr. Riviere was shown a Barn-Owl's nest containing six eggs and a young one —a large clutch certainly, but I have twice found seven eggs at Keswick. The Barn-Owl generally lays more eggs than the Tawny Owl.

21st.—Mr. E. Campbell Taylor saw a large Reed-Warbler, which he is satisfied was *Acrocephalus turdoides*, about a mile from where one was seen by the Rev. M. C. Bird in 1906 (Zool. p. 132). It is possibly a regular visitor to our Broads in very small numbers, and, if so, no doubt breeds here, which would not be surprising, as it is pretty common at Amiens, in France, less than three hundred miles away.

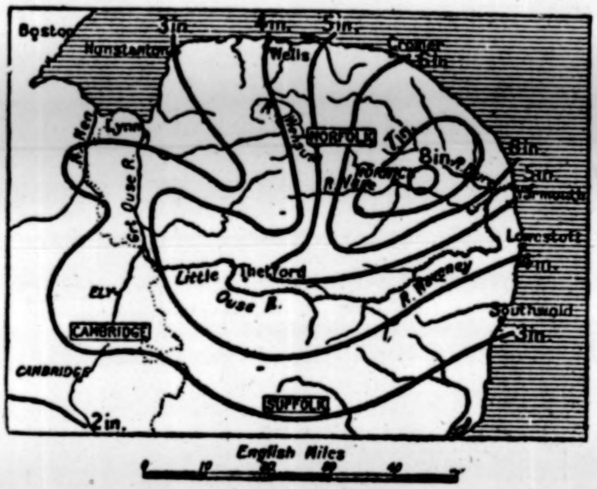
AUGUST.

9th.—A Willow-Tit obtained near Beccles by Mr. C. B. Ticehurst ('British Birds,' 1912, p. 218). In the new 'Hand-list of British Birds' (1912) the Marsh-Titmouse is split up into three races, of which this form, there called the Northern Willow-Titmouse, is the palest.

21st.—A Bittern seen by Mr. Robert Gurney on a tussock of bent-down reeds, with a completely fledged young one standing by it, its beak pointing up to the sky in the protective way usually assumed by this species. Although he was within an oar's length of both of them, and could even touch the young one with his hand, it was too agile to be caught.

24th.—Much rain to-day and yesterday. At 6 p.m. six Swifts passed, going east.

26th.—E.N.E., 6. *Six hundred and seventy million tons of rain in one day.* Very heavy rain began at 4 a.m., and continued falling all day, accompanied by an easterly gale. At 5.30 p.m. 6½ in. had been registered in my garden. At Norwich 7·34 in. fell in fourteen consecutive hours (A. Preston). Enormous damage was done throughout Norfolk by this terrific downpour, which, as the map shows, was especially heavy near Norwich, and between that town and Cromer. Many Pheasants were drowned, and a certain number of Partridges, but other species did not seem to suffer appreciably.



SEPTEMBER.

3rd.—N.W. to S.W., rain. As stated in 'British Birds' (p. 220), a Barred Warbler—a species of which 'The Zoologist' gave a good figure in 1909, by Mr. Arnold (Plate II.)—was shot at Cley, which, with the projecting promontory of Blakeney, now purchased by the National Trust, acts as a concentration area for many rare birds. Three more were seen there, and another was identified at Lowestoft by Mr. C. B. Ticehurst a few days before. Two also occurred in Yorkshire (*l. c.* p. 217), besides three in Shetland and two in the Isle of May ('Scottish Naturalist,' 1913, pp. 51, 67), and one in Ireland; so the British Isles were extensively visited by *Sylvia nisoria* in 1912. Even allowing for the great increase in observers, this species must surely be admitted to be more common than formerly.

10th.—The first appearance of Pink-footed Geese at Holkham, noted by Dr. Penrose.

14th.—An Arctic Tern on Breydon Broad (B. Dye).

OCTOBER.

5th.—W., 2. Two Ruddy Sheld-Ducks shot on Breydon Broad (E. Saunders), but these may have been escaped birds.

13th.—Green-backed Porphyrio† at Barton Broad; this also may have been an escaped example. Black Redstart at Wells (S. H. Long).

23rd.—W., 2. About a hundred Redwings came in from the sea at Overstrand. Aquatic Warbler at Cley ('British Birds,' p. 220).

26th.—W., 1.—I learn from Mrs. Fowler that quite early in the morning an unmistakable Nutcracker was sitting on the roof of Gunton Hall, which is less than a mile from the sea. No attempt was made to shoot it, and it presently flew away, but in the afternoon was again seen being chased by a Goldfinch. This is in the same parish, and close to the spot where a Nutcracker was seen by Miss Fowler on Nov. 26th, 1907. Another occurred at Gorleston, which is close by, in October, 1864, and another at Somerleyton; so this neighbourhood has been favoured.

31st.—Six Snow-Geese, as I am informed by Mr. Pashley, were seen on the coast; these probably belonged to the Duchess of Bedford.

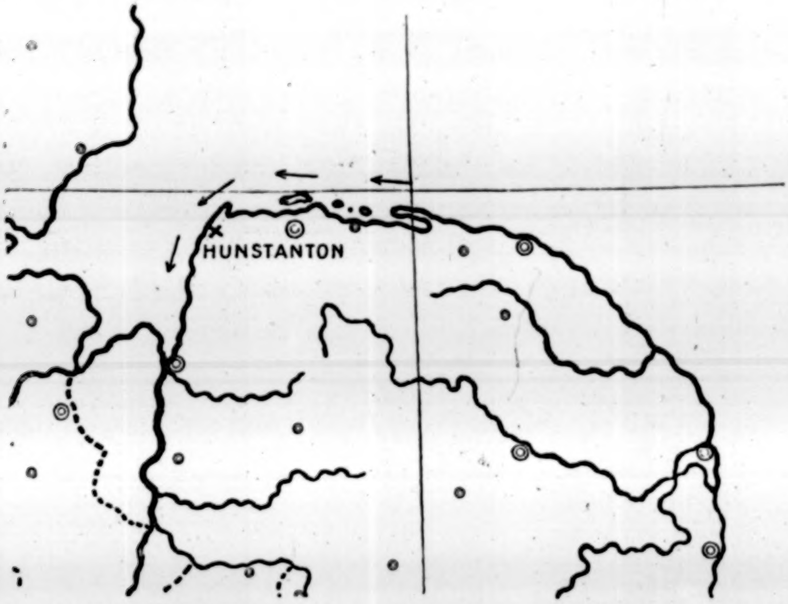
NOVEMBER.

1st.—A Glossy Ibis on Filby Broad, and another, on Dec. 2nd, near Burgh Castle (E. C. Saunders). The wind on Oct. 31st was N.W., 4, but I believe one, if not both, of the Ibises had been seen before that date.

3rd.—Mr. Patterson saw two Little Auks on the wing passing Yarmouth.

6th.—*Great Rush of Birds.*—At 7 a.m. the wind was N.E. at Great Yarmouth, and S.E. at Mundesley, but very light at both places. Whether the great rush of the autumn had been going on all day, or whether, indeed, it began on Nov. 5th, is not known, for it was only in part witnessed by two naturalists, Mr. B. B. Riviere and Mr. Sydney Long, who fortunately happened to be at Hunstanton, which is situated on the most rounded part of the Norfolk coast, and a favourable place for observation. From Mr. Riviere I learn the following particulars: From 6 p.m. on the evening of Nov. 6th, when the wind was veering to the south, but soft, until 11 p.m., when he and his friend retired to rest, great numbers of birds were following the coast-line at

Hunstanton, and the notes of Titlarks, Snow-Buntings, Fieldfares, Lapwings, Golden Plover recognized. The movement went on all night, for the notes of the birds were heard continually. Next morning (Nov. 7th) there was a S.W. wind, but too light to have any effect; though I had better continue the narrative of what Mr. Riviere and Mr. Long saw, in the former's words:—"We were out at 7 a.m., and were met by really an extraordinary sight—a continuous stream of birds, all flying south past Hunstanton, following the coast-line, and flying over the beach, and some over the sea—that is to say, following down the east side of the Wash. The birds were Hooded Crows, Rooks, Carrion-Crows (or else young Rooks, but, anyhow, feathered to the bill, with no bare skin around bill), Jackdaws, Lapwings, Fieldfares (in large numbers), Redwings (or possibly Song-Thrushes, but I think Redwings), Starlings (in enormous numbers), Sky-Larks, and hundreds of small Finches, the only ones which settled or came low enough to identify being Greenfinches, but I am sure there were Linnets, and I distinctly *heard* Chaffinches. We also heard Snow-Buntings. A good number of all these birds were flying at a great height, especially the Fieldfares, some of which were only just visible in the sky through Zeiss glasses, and I am certain there must have been more, quite beyond the field of



vision. Some of the small birds, which flew like Finches, were also at a great height. At nine o'clock we started walking up the coast north, with the birds coming towards us in undiminished numbers, and we reached the north coast, past Holme, and walked east nearly to Brancaster; the birds were then coming out of the east—that is to say, they were following the coast of Norfolk [see map]. The number of Starlings which must have gone by between 7 a.m. and midday is almost inconceivable, and I imagine they were passing all night as well." Mr. Riviere also saw two flocks of Wild Geese and eight Swans, probably Whoopers, as well as a flock of three hundred Twites resting on the ground. One curious feature in Mr. Riviere's narrative is that near Brancaster the birds were flying west, but when they reached Gore Point in Holme, where the coast bends, they preferred turning to the south to crossing the Wash, which is here only thirteen miles broad. As the morning wore on the passage of birds gradually slackened, and during the afternoon it was practically over. Meanwhile, a similar migration on a rather smaller scale, commencing on the 5th, was going on, on that day and the 6th, at Blakeney (R. Pinchin), Overstrand (W. Burdett), and Mundesley (Mack). Nor was this imposing array of birds confined to Norfolk, for in North Lincolnshire, Mr. Caton Haigh informs me, the movement was marked, as it was likewise in Heligoland (A. K. Schneider). But what is still more interesting is that it was registered by that acute observer, Professor J. Thienemann, at Rossitten, in the south of the Baltic, which is on about the same latitude as Edinburgh. Here the species passing, as I learn from Professor Thienemann, consisted of Hooded Crows, Jackdaws, Sparrow-Hawks, Buzzards, Fieldfares, Redwings, and Waxwings. It is exceedingly likely that among this host were some which reached Norfolk and Lincolnshire on Nov. 7th.

14th.—The Little Auk is a species which is much more powerless to resist the wind and waves than the Razorbill, although its wings are not much smaller in proportion to the body. We thought we had done with them for this year, but on the 14th three were detected by Mr. Ernest Gunn from Yarmouth Pier, where some had been seen a few days before by Mr. Patterson. About this time one was picked up on Sheringham golflinks (Sir Digby Pigott), and several more at Cley and Salthouse, mostly alive (H. Pashley), while others turned up at Wells, and five† at least were sent to Norwich. I had one† from Breydon Broad, and have no doubt that the total movement was considerable. Large numbers were seen on the coast of Northumberland and some in Yorkshire ('British Birds,' vi. pp. 315, 345). The Little Auk has long since been separated generically from the Razorbill, and stands alone the only one of its genus—the genus *Alle*. It seems to be much commoner than it used to be.

DECEMBER.

I find but little in my notes that is worth recording for December, except the Ibis already mentioned. On the 5th Mr. Gerard Gurney flushed a good number of Short-eared Owls at Ringland, on the 17th Mr. Riviere watched a Glaucous Gull at Yarmouth Harbour-mouth, on the 20th there was a Rough-legged Buzzard at Sidestrand, and on the 22nd a Magpie at Brunstead, where Mr. Bird had never known one to be before.

VARIETIES OF PLUMAGE.

On Sept. 3rd a White Swallow† was picked up at Salthouse (C. Hamond), and the day following a pied Lapwing† was shot in the parish of Weybourne adjoining by Mr. Spurrell. On Oct. 21st Mrs. R. Clarke informs me that she received a "Sabine's Snipe" from Gaywood, near Lynn, which is well known now to be a melanic variety of the Common Snipe.

On Oct. 23rd Mr. T. E. Gunn received a splendid red Partridge† (*Perdix montana*) from Bylaugh, and on Nov. 22nd Mr. Roberts had another† from Foulsham, and Mr. Gunn had yet a third on Dec. 23rd. This bird weighed 15 oz., but Mr. Gunn has had Norfolk Partridges of the ordinary hue which weighed 19 oz. (*cf.* Zool. 1886, p. 480), so perhaps 15 oz. was not exceptional. From Mr. Quintin Gurney I learn that there are believed to be still two of this singular erythrism alive in Sparham, where I lately made an attempt to see them but without success. Including these, the red variety of the Partridge has been recorded twenty-seven times in Norfolk, but, according to Mr. Bolam's 'Birds of Northumberland' (1912, p. 476), it has been killed much oftener in that county. In Northumberland also it seems that the first British examples of *P. montana* were recognized. Whether any of these red Partridges are the produce of birds imported by Carl Schaible and others from the Continent is uncertain, but seems probable, as they were met with abroad long before they were known in England. One thing which is curious about this erythrism is that more than two or three are never found in the same covey, either with us or abroad, nor is there any species in which the red pigment which goes by this name shows itself with such regularity, for in this Partridge it may be said to be of annual occurrence.

Some time in November a pure white Snipe†—white, that is, except for a shade of brown on the scapulars—was shot by a warrener on Salthouse Marsh, having probably recently come in from the sea. Mr. Pashley tells me that when in the flesh its legs were a lemon-yellow, and a pale, almost transparent, pink hue also suffusing both the eyes.

DESTRUCTION OF BIRDS AND BEASTS OF PREY.

In last year's Report reference was made to the destruction of birds of prey in Norway, and to the effect which it must infallibly have in reducing the number which migrate across the North Sea to England. Subsequently the late Professor Collett, whose loss all must deplore, was good enough to forward the official list of premiums paid by Government in 1910 for both beasts and birds of prey, that for 1911 being not yet published. One cannot but regret such a wholesale slaughter, which to a naturalist seems very unnecessary, and the wisdom of which is, to say the least of it, doubtful :—Bjorner (Bears), 26 ; Ulver (Wolves), 35 ; Gauper (Lynxes), 31 ; Jerver (Gluttons), 20 ; Rœver (Foxes), 10,983 ; Maar (Martens), 1374 ; Orner (Otters), 1508 ; Lommer (Divers), 5072 ; Omer (Eagles), 739 ; Hubroer (Eagle-Owls), 1359 ; Falker (Falcons), 1768 ; Honsehoker (Goshawks), 4712 ; Spurvehoker (Sparrow-Hawks), 9431. The Common Buzzard and Snow-Owl, although not down on this list, were also made to suffer.

THE DIURNAL MIGRATIONS OF CERTAIN BIRDS OBSERVED AT THE TUSKAR ROCK.

By Professor C. J. Patten, M.A., M.D., Sc.D.

Introduction.

Weirdly attractive and novel is the spectacle which presents itself to the student of ornithology as, in his silent night patrol, he watches from the dizzy heights of the lighthouse balcony the behaviour of bewildered migrants as they reel and topple under the mesmeric influence of the luminous beams. Equally attractive, and altogether more instructive in helping one to understand many features of migration which night largely occludes from view, is the study of diurnal movements of birds witnessed before and for some time after the first blush of dawn has dispersed the gloom of night from the rugged surf-lashed island-rock and its girdle of watery waste. Nay, more than this: in the study of diurnal migration one discovers the key to what probably would be, in a great measure, the natural mode of migration in the hours of darkness, if we imagine a complete absence of the numerous lanterns of lighthouses and lightships, whose brilliant beams betray the presence of wave-swept rocks, headlands, and shoals, beams which nightly stave off the imminent dangers to which our ships and lives are exposed, yet beams which entrap and lead to the destruction of numbers of feathered voyagers. A study of nocturnal migration, as the birds, allured by the treacherous dazzle of these resplendent beams, approach the lantern to sacrifice their lives by striking the glass, is a study of bird-migration in a highly distorted form; nor, indeed, is it credible that the multitudes of migrants, which, like glittering hosts, career wildly about in the rays, ever and anon striking the lantern, represent natural assemblies, even allowing that birds are more wont to exhibit gregarious propensities when flying in the dark. From what I have beheld when standing on the balcony, I would liken the so-called "rushes" of migrants—as heedless of each other's safety and their own the birds dash through the rays of light in wild disorder—to the unwilling assemblage of a panic-stricken crowd trying to escape from the dangers of a threatened disaster. There is good reason for believing that the so-called "rushes" of birds are the outcome of many conjoined assemblies, mustered chiefly in the vicinity of the lantern, the rays of which under certain conditions of the atmosphere are rendered particularly dense and brilliant, and so detain the birds. And although the migrants pass on in time from lantern to lantern, having lost many of their companions *en route*, so retarded becomes their flight under the blinding luminosity that, in certain localities, especially where lanterns are numerous, they are led to combine, even though unwilling, into prodigious and at the same time highly artificial assemblies. Birds migrating in company by day—except when held up by a very dense fog—present no such features: even the aërial movements of *Limicoline* birds (in which systems of flocking on the wing are highly developed, and manifold aërial patterns are displayed) show that the strictest discipline all the while is maintained.

THE SYSTEMATIC STUDY OF DIURNAL MIGRATION.

In studying many problems of bird-migration, careful and systematically conducted observations of diurnal movements —movements not distorted, and in which the birds fraternise naturally—are of supreme importance, and it behoves me at the outset to indicate briefly how I came to give special attention to this part of my research. In the first place, I noticed that on several occasions, when examining nooks and crevices in the Rock for specimens, land-birds were making a passage overhead. This feature was especially noticeable during the early hours of the morning. But at first such observations on my part were rather casual, and usually were only made on occasions when I descended from the balcony at dawn, after having been at the lantern all night. Naturally I examined the Rock before turning into rest, in order to collect any dead, wounded, or exhausted specimens, which might have dropped from the lantern. But there was no occasion to attend at the lantern every night during the whole period of darkness; indeed, meteorological conditions were often such that it was inexpedient to do so. Attendance on occasions when no birds, or at the most very few, appeared in the rays and these at long intervals of time, was generally completed about 1 or 2 a.m., and my period of sleep was procured from about 3 to 7 a.m. Hence, I was oblivious of the features of diurnal migration which was going on during most of these hours. Not, however, altogether oblivious. For frequently the Lightkeeper, on early morning watch, would rouse me from my slumbers by telling me of a migration of birds across the Rock, and of those which alighted—sometimes strange ones—and which could be identified. Disinclined to rise so early and at first resentful that the brief span allotted for sleep should be broken into, I soon, however, learned that my best thanks were due to the Lightkeeper, for it was through his instrumentality that I identified many interesting specimens of birds as they tarried for a little on the Rock. I was deeply interested on those occasions when I once got out, not only because I collected specimens, but also because of the intensely important observations which I made. And so completely did the call of the Lightkeeper take possession of my mind that—fully expectant of his arrival—I often found myself awaking spontaneously as the first glimmer of grey dawn peeped through my window. Furthermore, I seemed to become all at once wide-awake, even though I may have lain down but two hours previously. And now, while not only thinking of what might be awaiting my advent on the Rock, but also listening to the actual chirp of well-known birds, there developed within me a glow of enthusiasm which culminated in an ardent desire to rise every morning at dawn for the remaining period of my second autumnal visit.

In the second place, for a different reason, I became anxious to make a systematic study of bird-migration by day, commencing at dawn. In the interval which elapsed between my second and third visit to the Tuskar Light-Station, Mr. Eagle Clarke's eagerly expected and most welcome work on migration was published, and I read with much interest how the author found that diurnal movements of certain birds, Swallows, Pipits, and Wagtails, formed a distinct and important feature as personally witnessed from Eddystone Light-Station. I was therefore most anxious to compare his results with mine. I may say that in most respects our observations markedly coincided, but there was one very important difference to be made out, namely, that the direction of flight offered, in the main, a marked contrast. I shall return to this point presently. I commenced putting my projected scheme into operation on August 25th, 1912, and rose at dawn every succeeding morning until September 12th; nineteen occasions in all. It was my original intention to continue this early morning rising scheme until the completion of my time at this Light-Station, namely, September 30th, but pressure of work, added to renewed vigilations at the lantern, seldom allowed me to retire before 3 a.m. However, on most mornings between September 12th and the end of the month, I managed to rise between 6 and 7 o'clock, thereby continuing to make several more important observations. With the exception of a short interruption, lasting about twenty minutes for breakfast, my personal observations, made during nineteen consecutive mornings beginning at dawn, always lasted fully five hours at a stretch; while when migration was particularly active and more prolonged, I increased the span of my watch some hours more.

Diurnal Migrations of Wagtails, Pipits, and Swallows.

My primary intention was to make observations on Wagtails, Pipits, and Swallows, whose migratory movements appear to be chiefly performed in daylight. However, I gained an insight into some features of diurnal migrations of other species; and inasmuch as I found the majority of these also at the lantern at night, it was incumbent to consider most carefully the circumstances under which the birds appeared on the Rock; also to obtain all the objective evidence possible on this matter from a thorough post-mortem examination of the specimens collected. Passing over this point for the present, I shall now briefly describe the migrations of Wagtails, Pipits, and Swallows. Wagtails had been seen already passing the Rock a few mornings previous to the time when I started my early-rising scheme. But I was in time to make the first record of the migration by day of Meadow-Pipits. This species did not make its appearance on the Rock until August 28th, and I did not detect the regular movement setting in until September 1st. The same may be said of Swallows. The regular migration did not start until August 30th. Prior to this, however, I had seen odd Swallows flitting past at uncertain intervals. From the point of view of obtaining rest it was fortunate that the migration of the above-mentioned birds set in during part of a bright lunar phase, on which nights the rays of the lantern were rendered too feeble to allure migrants, and so visiting the balcony for many hours was not the most profitable way of spending time. It also happened that, as the moon gradually waned and the dark phase was entered upon, very few birds appeared near the lantern, owing to the prevalence of wind and clear atmosphere. Indeed, it was not until the last lunar quarter was almost complete that migrants began to appear in any conspicuous numbers in the rays. This was on the night of September 11th, 1912, from which date, until the end of the month, I renewed my nocturnal watches at the lantern with much regularity, the weather conditions and lunar phases on the whole lending themselves to favourable results. To return to my observations on the migratory movements of Wagtails, Pipits, and Swallows. The daily time of their passage over the Rock was ushered in with marked regularity. Wagtails and Pipits appeared almost synchronously with the ascent of the sun over the horizon, though it was not exceptional to see the birds before sunrise. Swallows were more wont to arrive an hour or two later, but this event also exhibited variation in time within certain limits. At first I used to watch the birds from any point on the Rock. Thinking, however, that my presence might in any way interfere with the natural inclination of the direction or speed of their flight, I decided to keep ambushed in a crevice, where at the same time I could fairly well command a good view of the greater part of the Rock. I certainly found, as far as Wagtails and Pipits were concerned, that by adopting this form of strategy more birds descended and alighted than when I stood up and discarded concealment. Roughly speaking, about 5 per cent. of the total number observed tarried on the Rock. This percentage was taken in the aggregate; daily it varied markedly. Thus, on warm, calm days, as well as on rough, windy days, more birds seemed to halt than when the weather was intermediate, and especially when it was uncertain in character.

In the first case, the birds, possessed perhaps of an instinctive knowledge that the weather appeared settled, took things relatively leisurely, and so were probably tempted to come down and endeavour to relieve their hunger, small flies, their natural food, being plentifully distributed in warm weather over the drift seaweed and other material. In the second case, the high wind no doubt acted as a deterrent factor in their flight. But I should point out that in reality very few birds appeared under such weather conditions, especially when persistent. Indeed, on several windy mornings no birds crossed the Rock at all. Having alighted, the behaviour of Wagtails and Pipits was fairly characteristic. Both were active and wary, the Wagtails, however, more so, and if I suddenly appeared from ambush the birds would immediately ascend and fly off. When, however, the wind was fresh they laid low, and could generally be approached quite closely. Only exceptionally, however, did I observe exhausted or listless Meadow-Pipits, and no Wagtails in this state. I cannot give at the present moment an estimate of the proportion of White and Pied Wagtails,* but, excluding the small number of Ray's Wagtails which I noted, I would say that these two species, taken together, formed two-thirds, and Grey Wagtails one-third, of the whole number observed. I first was under the impression that the Meadow-Pipit was the only species of its kind which affected these diurnal passages, but at the termination of my visit I collected a Rock-Pipit, which, with several others as well as with Meadow-Pipits, I actually saw descending and alighting as their companions winged their way onwards. The familiar note of the Meadow-Pipit largely predominated, but now and again I detected cries somewhat similar in character, but differing in pitch and accentuation. The similarity of the voice of Pipits generally renders it a difficult matter in arriving at any conclusions as to what species, rare to Ireland, may have been migrating in company with the common species on some of these diurnal flights. The evidence already given, regarding the circumstances under which I collected the two Tree-Pipits,* leaves little doubt in my mind that these two birds alighted directly on the Rock in daylight, having abandoned their companions as the latter passed by in the vicinity. On this point I shall have something more to say presently. The speed at which both Wagtails and Pipits flew was about twenty miles an hour. I made my calculations, which I claim to be only of approximate value, by measuring one of the major axes of the Rock, an axis which at the same time corresponded to a favourite path pursued by the birds overhead. Then, with a stop-watch, I noted in seconds the time taken by the birds in traversing this axis. I took a vast number of these time-observations, and found that in favourable weather, with light wind, the speed of flight altered but little. The average height at which Meadow-Pipits flew was about seventy feet or two-thirds the height of the lighthouse tower. Wagtails flew higher, passing, as a rule, well over the lighthouse dome; and the average elevation was about one hundred and twenty feet. However, the altitude of flight was subject to considerable variation.

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* While this paper has been passing through the Editor's hands, I have carefully examined thirteen Wagtails obtained on the Rock last autumn (1912). I find that eleven are white and two pied. My best thanks are due to Mr. Eagle Clarke for aiding me in the identification of the species, which in immature garb closely resemble one another.

As in the case of Meadow-Pipits, the chirp of Wagtails was dominant and oft repeated, thereby affording me much aid in distinguishing the different species flying past.

Swallows, in making a diurnal passage, swept by the Rock with rapid twisting flight. They did not seem to heed my presence, and often flew close over my head. Now and again a bird or two would forsake its companions and take up a circuitous route round the Rock for the greater part of the day, all the while hawking for insects. Only very exceptionally would a bird alight; when it did it was usually for the purpose of seeking shelter in a large cavern-like crevice. Very different was the case when Swallows, affecting a nocturnal journey, were held up at the lantern in thick weather. These birds, possessed of a marvellous faculty for not striking, wearied themselves out by flying round and round the light for many hours. At length, when day broke, they either settled down on the balcony rails, or descended to the Rock, fatigued to such a degree as to suffer one to capture them almost with the hand.*

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* *Vide* "Discovery of the Tree-Pipit on the Tuskar Rock, Co. Wexford," 'Irish Naturalist,' vol. xxi. November, 1912, pp. 209–213.

The average height from the ground at which Swallows, on diurnal migration, passed by was about forty feet; but their gyratory and undulatory movements through the air subjected the altitude almost to an unlimited degree of variation. The speed of flight was certainly up to one hundred miles an hour.

NATURAL AND EXCEPTIONAL FRATERNITIES.

I now pass on to consider two important features in connection with the above-mentioned diurnal migrants: one, the extent to which the birds tend naturally to fraternize; the other, the factors which seem to be responsible for the formation of larger communities than are usually seen. In regard to the first feature, I may say that were one to make merely a few casual observations on a small party of passing migrants, and because these birds were not immediately followed by others, the watch was discontinued, or, at all events, carried out in a disconnected way, then the fundamental feature of diurnal migration here would be lost sight of. That is to say, its more or less continuous or chain-like character, which becomes evident only when a lengthened watch was kept up, would not be observable. For in this chain are links of various sizes and shapes, and here and there gaps exist where the links are broken. Even when an intermission of fifteen minutes or so takes place and no birds are seen, and allowing that more than one link is severed, yet the chain-like character, as the migrants stream past, singly or in small parties, for perhaps *six hours on end*, is still quite evident. Pipits formed a more continuous chain than did Wagtails, but it is not my intention in this paper to enter into details on the migrations of these or any other birds, which are being dealt with respectively in separate articles. Suffice it to say that, grouping Wagtails, Pipits, and Swallows together, these birds passed the Rock most often in small parties; less typical links in the chain being formed by solitary travellers. By making careful and protracted observations with the aid of a pair of strong prism binoculars, I was able to see that the migrants were often spread out on either side; and, no doubt, beyond the range where I could descry their presence, they, as part of the stream, were heading in the same direction. Hence it might be more appropriate to designate this streaming mass of migrants as moving in a broad procession, loosely and unevenly marshalled. Call it what one will, there remains the important fact that vast numbers of birds—all heading in the one direction, all moving in an orderly fashion, and all exhibiting the same steady and uniform speed of flight, so that one bird was seldom seen overtaking its companion—were performing a natural and quite undisturbed migration, a migration which went on for many consecutive days during a given time of the year, only interrupted spasmodically by haze, which held the voyagers up, or by storm which drove them back to alight on the shore or on rock-islands, *en route*. And without particularizing in regard to species, I have little doubt that when undisturbed by adverse weather, whether it be haze or storm, and when not allured by the beacon's blaze, the nocturnal peregrinations of birds follow the same lines as I have just detailed in the case of migrants travelling by day. If, for a moment, we suppose this not to be the case, but rather that the multitudinous assemblies or so-called "rushes" are, by a kind of avian volition, drawn up as the journey is being started, or shortly afterwards, then we should expect visitations of these "rushes" (at all events of the widely distributed and abundant species) more regularly and frequently at our lighthouse lanterns, and not necessarily in only a special phase of the weather. If birds normally migrated in dense throngs at night, their passage in great numbers through the more distant part of the rays of the lantern in clear weather (when they would not be allured to the glass) would at all events be noticeable. But such is not what one sees. Indeed, it is only by watching from the balcony with unremitting attention that one can gather evidence of the analogous features between the migratory flights of birds by night and by day. On a calm night, with a clear and dry atmosphere, so that the rays of the lantern are rendered feeble, I have beheld only single birds and small parties flitting across the rays in somewhat regular succession, and passing on without showing any signs of being enchanted by the light. This feature may be noted for many hours at a stretch, and as evidence that the birds were not being held up, I observed that there was no augmentation in numbers, or confusion, or even hesitation in the flight. At first, when my main interests were centred in studying the phenomenon of "striking," the behaviour of migrants on such clear nights greatly disappointed me; but when I became thoroughly familiar with the processional migrations performed by daylight, this analogous feature, detected at night, became highly interesting. There is another noteworthy feature in connection with the natural night-flights, namely, that the birds show a decided preference for travelling with members of their own kind. Of course, closely connected species and birds about the one size probably fraternize more readily than when such relations are wider apart.* By day one sees analogous fraternities. Pipits and Wagtails, birds of close affinities and endowed with much the same velocity and power of flight, appeared about the same time after dawn and travelled in company, probably to the end of their journey. Swallows (sociable and peacefully disposed to other small birds, though brave and aggressive in their pursuit of the Hawk or other piratical member of the bird-tribe), with affinities remote from those of Wagtails and Pipits, and with power and velocity of wing differing in a marked degree, appeared later in the morning, but, soon overtaking their companions, accompanied them for only part of the journey.

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* I did actually manage to capture a few Swallows in my hand, as the birds were perched on the balcony railings at dawn. When liberated some returned to alight almost in the same spot; others descended to the Rock.

In regard to larger communities of diurnal migrants than usual, one main factor seems to be responsible for their formation, namely, any obstacle which can hold up the advancing body of birds adequately and for a sufficient time to allow the rear-guard (here represented by a procession of an indefinite length, so to speak) to press forward until a vast assembly thus constituted becomes congested, and in endeavouring to move apace, confusion arises in the ranks. Several of these obstacles are natural forces, *e. g.*, fog, dense haze accompanied by drizzling rain, and a strong head-wind with driving rain, especially when setting in suddenly after a calm. It is obvious that fog or haze would act as an obstacle with much greater force in the hours of darkness, because, as far as the generality of land-birds is concerned (and these birds in the main concern us here), the evidence goes to show that they have no great aptitude for finding their way in the dark. Hence, while they manage to move along on clear nights much assisted by moon- and starlight, as well as by the fact that when out at sea they encounter no natural barriers, the argument remains that they possess but little useful vision at night. What instinctive sense of direction at the same time they may be gifted with is a most difficult question, and one which I do not propose to deal with at present. But we do know of the velocity and marvellous endurance of wing power that a bird possesses, and in allowing the fullest amount of credit for such faculties, we are certainly in a position to argue that, even if birds wander from the direct route leading to their ultimate destination, it matters but little, for they will arrive home in due season. But, as we have just seen, nocturnal migrants in thick weather are rendered very helpless. And in this helpless and hapless state the voyagers, in their attempts to move aimlessly along, now behold the beams shining from the lighthouse. Allured by their dazzle, and desirous to quit the enveloping gloom, the migrants close up nearer and nearer to the rays until they find themselves within the doors of what they little know is veritably a glittering avian death-trap.

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* I could not imagine Goldcrests and Corn-Crakes, or Manx Shearwaters and Sedge-Warblers, choosing each other's company when travelling, and yet I have seen such, and other equally peculiar couplet combinations at the lantern on hazy nights, when every sort of migrant runs the gauntlet of being "held up."

But by day also, while there is no flash from the lighthouse to cause further confusion, nevertheless the fog itself becomes, though in a less degree than at night, a very serious deterrent factor to the migrants, whose speed, regularity, altitude, and direction of flight are soon thrown out of gear. Such features may be observed when a thick fog suddenly lowers over a vast tract of slob-land tenanted at the time by great flocks of shore birds. That their vision has no penetrating power in such a state of the atmosphere is proved by the way the birds will allow an intruder to approach extremely close, and *vice versa* in the way that they will suddenly loom up out of the fog and brush just over one's head. The flight at the same time is full of disorder, and the loud and oft-repeated cries indicate lack of contentment, the birds rushing hither and thither as the throng swells. And there can be little doubt that diurnal migrants, as they undertake protracted journeys, exhibit under similar atmospheric adversities such-like features.

Rain, when persistent, and especially fine drizzling rain which accompanies haze, has no doubt a retarding effect on the flight of birds; still, it is wonderful how land-birds, whose feathers soon become soaked with wet, keep on the wing. From the lighthouse balcony I have observed birds in rain flying round and round the lantern practically all night long. Indeed, here we have further evidence giving support to the view that endurance of flight depends not so much upon the possession of long pinions,* as upon the structural adaptability for flight of the whole machinery of the fore-limb. A bird must add enormously to its weight when its feathers get wet; in fact, no material varies more in weight than a feather perfectly dry and one even only slightly moistened. Hence there must be a tremendous reserve force of muscular wing-power to overcome the resistance offered under such altered condition of plumage. And this reserve force must be all the more powerful when we remember that migrants frequently do not encounter rain until late on in the night, when already they may have been observed to have expended a considerable amount of energy of wing-power during earlier hours of darkness.

In regard to the deterring influence of a strong head-wind in cases where it suddenly springs up accompanied by showers of driving rain—in short, a "sudden squall"—I have had occasion to observe how Pipits, heading against the gale, suddenly dropped down to the Rock. Sometimes a whole party of about a dozen would descend, but it was more usual for about two-thirds of the party to break their journey in this way.

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* *Vide* paper on "Wrens on Migration observed at the Tuskar Rock," 'Irish Naturalist,' vol. xxi., July, 1912, pp. 127–129; also paper on "The Dartford Warbler in Ireland," 'Irish Times,' December 26th, 1912, pp. 5 and 6.

When the migration was active and the stream almost continuous, not many minutes elapsed before the Rock accommodated half a hundred birds, and as the wind and rain abated and the migrants rose and resumed their journey, they, as they circumvented the lantern (an interesting sight in daylight), appeared to form quite a good-sized flock, which, if appearing at night, might have been designated as a small "rush" of Pipits. Here again we see that the so-called "rush" was really an assemblage temporarily held up by temporary stress of weather. But in regard to nocturnal migrants, there is this difference to note—that, if overtaken by a "squall," the birds, instead of swooping down to the Rock, would, in all probability, on approaching the lantern, endeavour to obtain shelter to leeward, but becoming confused by the glare of the rays flashing across them, would sooner or later be carried to windward, and then of a sudden crash in against the glass. This "incidental strike" is very characteristic in rough weather, especially when birds have been trying to forge their way in a head-wind. As mentioned elsewhere,* they are usually hurled against the glass, and clouds of feathers are seen issuing from their backs or breasts. With a rebound they leave the glass immediately, and, borne away by the wind lifeless or fatally wounded, drop on the Rock or into its surrounding waters.

Before leaving this part of the subject, I may say that there is good reason for believing that birds of prey, when on migration (especially when near the land or an island whence they can bear off their quarry), may cause disorder and even hold up several parties of small birds on diurnal migration. During my last visit to the Tuskar Light-Station I saw many Merlin Falcons, some passing, others alighting on the Rock, and when they were about I have seen Pipits wildly excited; on one occasion one of these little birds suddenly descended and alighted close beside me panic-stricken. Almost immediately I perceived a Merlin flying towards the Rock with a Pipit in its talons.* Likewise we should expect that Owls, harassing small birds at night, would so confuse them as to render them in the vicinity of the lantern more liable to rush in and strike the glass. I have seen a flock of Terns brush by the lantern in the dusk of the evening when pursued by a couple of Skuas, and if the latter put their piratical methods of seeking food into action during the hours of darkness, there may be forthcoming a cause of the sudden approach of numbers of Terns, which I have seen precipitating themselves against the glass, as though they were taking the lantern by storm.

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* *Vide* "Grasshopper-Warblers on Migration observed at the Tuskar Lighthouse," 'Irish Naturalist,' vol. xxi., August, 1912, p. 140; also *vide* "The Dartford Warbler in Ireland," 'Irish Times,' Dec. 26th, 1912, p. 5.

* The Merlin alighted and commenced plucking before I disturbed it. Hence I recognized his quarry by examining some of its feathers.

(To be continued.)

NOTES AND QUERIES.

AVES.

The Nuptial "Play" or "Display" of the Yellowhammer and Pied Wagtail.—Never having met with any description of the behaviour during courtship of the males of either of these birds, I have thought that the following notes might be acceptable to some of the readers of 'The Zoologist':—On May 22nd, 1908, at Farnham, Suffolk, I noticed a pair of Yellowhammers in the middle of the road. The male was moving along the ground close to his mate, and was holding up his wings high above his back, as a Redshank often does for a short time after alighting. This year (1913), on April 27th, I saw a pair of Pied Wagtails on a bare plot of ground, and only a few yards off. The male kept approaching and moving partly round the female, bowing to her repeatedly, much after the manner of a cock Pigeon or Dove (the Barbary or Laughing Dove in particular), but the action was performed in a rather more jerky manner, and was somewhat lacking in that courtly grace with which the male Dove makes his obeisance, the head being held to the ground for scarcely an instant, but raised at once in readiness for the next bow. The performance was repeated very rapidly, the little bird each time drawing himself up to his full height, and so making himself look very long and slim. The downward movement was made with such energy as to bring to mind the actions of a Nuthatch hammering at a nut.—G. T. Rope.

NOTICES OF NEW BOOKS.

Heredity. By J. Arthur Thomson, M.A., &c. John Murray. (Second Edition.)

The problem of heredity is not confined to the sciences of botany and zoology, and cannot be separated from a human factor of the highest importance with which most men are conversant. Hath not the evolutionary potter power over the clay? and is the iniquity of the father visited upon the children unto the third and fourth generation? The question of the hereditary transmission of ideas and experience is approached in different methods by the biologist and psychologist, while are not ideas and experience in most cases acquired characters?

This book, the second edition of which now appears, has already gained a consensus of opinion as being the best and most complete publication on the subject. It refers to all the best work and investigations that have been done or made at home and abroad, and is *biological* in treatment and purview. The reader is soon familiar with the steady progress of Mendelism in evolutionary conceptions, and, as Professor Thomson clearly states:—"Now, there is no need to hamper the Evolution Theory by restricting selection to minute variations. We know that sports, mutations, or discontinuous variations are frequent, and that they are remarkably stable in their hereditary transmission. We know also that many domestic races have, as a matter of fact, arisen by sudden mutation." This view strengthens the value of the Darwinian theory by restricting its operations, and disposes of a superfluous value sometimes enunciated as "the all-sufficiency of natural selection." Many inheritances are of doubtful value, many are more than valueless. In human psychology we see the baser qualities more frequently transmitted, and in human biology dangerous tendencies an unwelcome inheritance; genius a "sport" scarcely transmitted beyond the second generation.

Prof. Thomson's volume is brought in this edition thoroughly up to date, and it will puzzle the reader to find any responsible worker on the subject ignored, nor will he fail to find a candid examination of views other than his own. The chapter on telegony is an excellent example of judicious criticism combined with an unbiassed statement of the facts used in support of that theory.

The Dictionary of Entomology. By N. K. Jardine, F.E.S. West, Newman & Co.

A glance at this volume will almost surprise an average entomologist by the number of terms used in his science. Mr. Jardine seems to have successfully grappled with the derivation of these words, and his book will doubtless find its place on most entomological bookshelves. As the author requests to be informed of any omissions, "in order to render future issues more complete," we do not hesitate to point out a few items that may help to serve that purpose.

In the definition of the word "Hemiptera," that Order is stated to comprise insects possessing, among other characters, upper wings which are "partly coriaceous and partly membraneous." This will not apply to some members of its suborder "Homoptera." The term "Hemiptera" is by many students considered to be preoccupied by "Rhynchota," and the latter word should therefore find a place in the catalogue. So also should "Odonata" (Dragonflies), while the term "mimicry" has been so much pressed and laboured in entomology that it should at least be recognized in the Dictionary. The best previous lexicon on this subject, and the first of its kind, is found in Burmeister's 'Manual of Entomology,' of which an English translation by Shuckard appeared in 1836, and this may well be added to the "Authorities Consulted." We expect Mr. Jardine's wish for a knowledge of "omissions" has been gratified by other writers, and that he will thus in a future edition be able to make this really good and useful book an even better and more comprehensive one.

EDITORIAL GLEANINGS.

At a recent meeting of the Zoological Society of London, Dr. S. F. Harmer, F.R.S., F.Z.S., read a paper on "The Polyzoa of Waterworks." He gave some account of the serious trouble which had been caused by the occurrence of a rich and varied fauna in the pipes of certain foreign waterworks, notably at Hamburg and Rotterdam. As was first shown by Kraepelin, the Polyzoa play a prominent part in the activity of the pipe-fauna, by feeding on Diatoms and other microscopic organisms, and serving in their turn as the food of other animals which prey on one another. The nutritive matter rendered available by the presence of enormous numbers of Polyzoa is thus in large measure responsible for the existence of other constituents of the fauna, which may include even fishes, such as the Eel and the Stickleback. The organic material supplied by the disintegration of the Polyzoa and other animals is believed to be important for the nutrition of Iron-Bacteria, which are well known to cause the most serious trouble in waterworks.

He then gave some account of five cases, which had recently come under his own observation, of the occurrence of Polyzoa in English waterworks in sufficient numbers to give rise to very serious inconvenience. In one or two of these cases the advice given by Kraepelin, in his paper on the Hamburg pipe-fauna, was being followed, by the introduction of a system of filtration, the principal object of which is to remove the microscopic organisms on which the Polyzoa, and ultimately the whole assemblage of animals in the pipes, depend for their nutriment.

The Polyzoa found in the five systems considered were referred to four species, and some account was given of the synonymy and distinguishing features of these. One of the species found was *Paludicella articulata*, Ehrb., and the specimens were remarkable for the profusion with which hibernacula or winter-buds were being produced. The examination of the hibernacula resulted in the discovery of some evidence with regard to the mode of development of these structures—a subject on which no observations appear to have been hitherto published. The evidence recorded may have some bearing on the question whether there is any homology between the hibernacula of *Paludicella* and the statoblasts of Phylactolæmata.

THE Norfolk and Norwich Naturalists' Society, at its Annual Meeting this week, elected Miss A. M. Geldart as President for the coming year. "Miss Geldart is, we believe, the first woman to hold that office. A scientific society knows nothing of differences of rank or of sex amongst its members, but only of efficiency and of those qualities of mind that make for efficiency in the work of the Society. We hear a good deal nowadays of what is woman's sphere and what is man's sphere in industry, in politics, and so on; but in science and art and literature there is no question of separate spheres, but only of human attainments; and we welcome the election of the first woman President of the Society on her proved merits as a naturalist."—'Eastern Daily Press,' May 1st, 1913.

MR. F. H. SIKES, F.L.S., of Burnham Abbey, Burnham, Buckinghamshire, has presented his collection of British Shells to the Natural History Museum, South Kensington. This collection, says the 'Times,' is very rich in authentically named varieties, a fact which will cause it to be greatly valued by British collectors. It also contains a large proportion of the species and varieties enumerated in J. W. Taylor's monograph of the land and freshwater mollusca of the British Islands.

The 'Pall Mall Gazette,' in commenting on this national gift, remarks:—"When the shells are in place, a few afternoons spent in studying the cases will be worth months of poring over text-books, and ought to teach thousands of people how to add to the attractions of a seaside holiday by searching intelligently for the delicate treasures of our shores."

BRITISH 2 JUN 13 MUSEUM

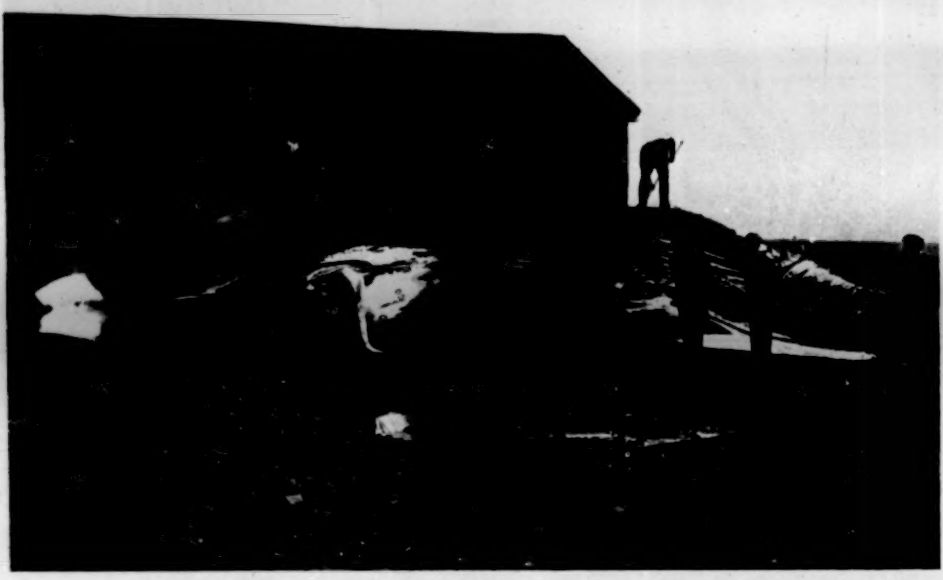

FIG. 1.—On the truck platform ready to be taken round to the factory. Note the "genital sheath." A few of the large barnacles are also shown.

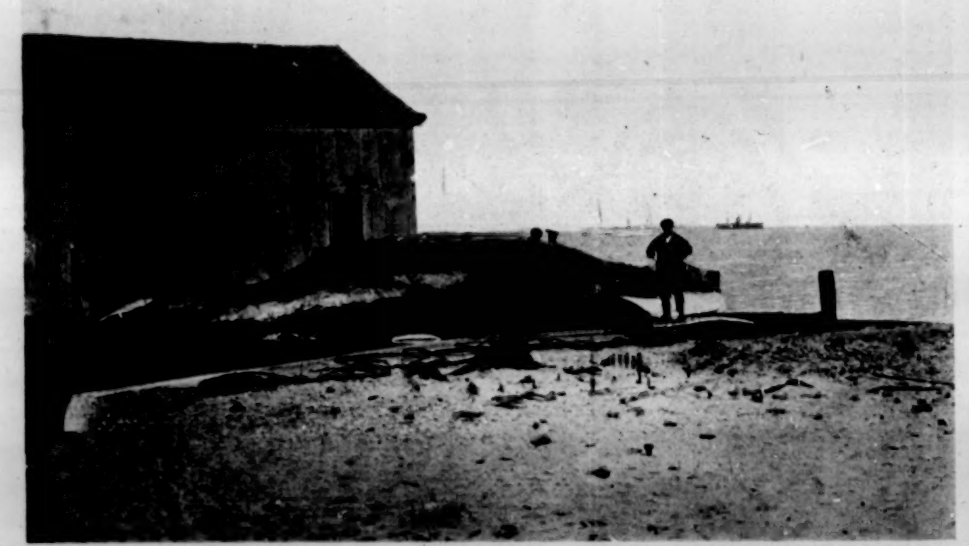

FIG. 2.—A better idea of the Whale on the truck platform, ready to be taken round the Bluff to the factory. This picture shows the rigid lips of the "genital sheath," and conveys an idea of the length of the "flippers" (man standing on one).

MEGAPTERA BÖOPS.